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Docket No. 200309416-1

Serial No. 10/761,479

**LISTING OF THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A value set selection system for optimizing a circuit design, comprising:

a real cost function that generates a real cost for a first value set associated with a set of parameters the first value set corresponding to a circuit configuration associated with the circuit design generated by a circuit analysis tool;

a genetic algorithm that generates a second value set that is a value set variation of the first value set; and

a cost function approximator that determines an approximate cost based on the real cost and the value set variation between the second value set and the first value set.

2. (Original) The system of claim 1, the genetic algorithm generates at least one additional value set that is a variation of the second value set.

3. (Original) The system of claim 2, the cost function approximator determines an approximate cost for the at least one additional value set based on the approximate cost of the second value set and the at least one additional value set.

4. (Original) The system of claim 1, the cost function approximator comprising an incremental cost function that determines the approximate cost of the first value set variation based on an incremental difference between at least one parameter of the first value set and the second value set, and the real cost associated with the first value set.

5. (Original) The system of claim 4, the genetic algorithm generates subsequent generations of value sets based on value set variations derived from at least one of the first value set and the

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second value set, the incremental cost function determines an approximate cost of a value set variation based on an incremental difference between the value set variation of a subsequent generation and the value set variation of a preceding generation, and a cost associated with the value set variation of the preceding generation.

6. (Original) The system of claim 4, further comprising an incremental cost function generator that generates the incremental cost function based on the first value set and an associated real cost for the first value set.

7. (Original) The system of claim 1, further comprising a first group of value sets represented as real chromosomes, the real cost function provides corresponding real costs associated with each of the real chromosomes, and a second group of value sets represented as speculative chromosomes, the cost function approximator provides corresponding approximate costs associated with the speculative chromosomes.

8. (Original) The system of claim 7, the genetic algorithm generates the second group of value sets represented as speculative chromosomes from parents selected from the real chromosomes.

9. (Currently Amended) The system of claim 8, the genetic algorithm generates at least one additional generation of speculative chromosomes originating from parents selected from at least one of the speculative chromosomes and real ~~chromosomes~~ chromosomes, the at least one additional generation being added to the second group of value sets.

10. (Original) The system of claim 8, the genetic algorithm selects parents from the second group of value sets based on the corresponding approximate costs associated with speculative chromosomes.

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11. (Original) The system of claim 7, further comprising a validation component that initiates a validation of at least one value set represented as at least one speculative chromosome, the validation comprising executing the real cost function to provide a real cost associated with the at least one speculative chromosome and adding the at least one speculative chromosome to the first group of value sets.
12. (Original) The system of claim 11, the validation being initiated based on one of speculative generation, approximate costs converging and errors exceeding a predetermined level.
13. (Original) The system of claim 1, the real cost function comprising an optimization tool for optimizing a circuit design, and the given value set being a circuit configuration generated by the optimization tool.
14. (Currently Amended) A system for selecting a value set associated with a set of parameters of a circuit design, the system comprising:
- a real cost function that determines a real cost for each of a plurality of real chromosomes that represent different value sets associated with a set of parameters the plurality of value sets corresponding to different circuit configurations associated with the circuit design generated by a circuit analysis tool;
  - a genetic algorithm that generates a first generation of speculative children chromosomes from parents selected from the plurality of real chromosomes, the genetic algorithm generates subsequent generations of speculative children chromosomes from parents selected from at least one of preceding generations of speculative chromosomes and the plurality of real chromosomes, the speculative chromosomes representing incremental differences in the value sets between at least one parent chromosome and an associated child chromosome; and
  - an incremental cost function that determines speculative costs for a given speculative chromosome based on the incremental difference in the value sets between at least one parent

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chromosome and an associated child chromosome and the cost associated with at least one of the parent chromosomes.

15. (Original) The system of claim 14, further comprising an incremental cost function generator that generates the incremental cost function based on a minimum real cost associated with the plurality of real chromosomes.

16. (Original) The system of claim 15, further comprising a validation component that initiates a validation of at least one speculative chromosome, the validation comprising executing the real cost function on the at least one speculative chromosome to associate a real cost with the at least one speculative chromosome and adding the at least one speculative chromosome to the plurality of real chromosomes.

17. (Original) The system of claim 16, the incremental cost function generator generates at least one additional incremental cost function in response to a validation being initiated if a desirable solution associated with the set of parameters has not been achieved.

18. (Currently Amended) The system of claim 14, the real cost function comprising an optimization tool for optimizing a the circuit design, and the plurality of real chromosomes being a plurality of data base files representing different circuit configurations generated by the optimization tool.

19. (Currently Amended) A system for determining costs associated with a set of parameter values representing a solution circuit design, the system comprising:

means for generating real chromosomes representing different value sets associated with a set of parameters wherein the real chromosomes represent different circuit configurations associated with the circuit design;

means for determining a real cost of at least one of the generated real chromosomes;

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means for generating a speculative chromosome representing value set variations from at least one of the generated real chromosomes; and

means for determining a speculative cost based on the real cost and a difference in value sets of at least one of the generated real chromosomes and the speculative chromosome.

20. (Original) The system of claim 19, the means for generating a speculative chromosome being operative to generate additional generations of speculative chromosomes and the means for determining a speculative cost being based on a difference in value sets of parent chromosomes and speculative child chromosomes and a cost associated with at least one parent chromosome.

21. (Original) The system of claim 19, further comprising means for initiating validation of at least one speculative chromosome by executing the means for determining a real cost on the value set of the at least one speculative chromosome.

22. (Original) The system of claim 19, further comprising means for generating the means for determining a speculative cost based on an initial real chromosome and an associated real cost.

23. (Original) The system of claim 18, the means for generating the means for determining a speculative cost being repeated upon validation of at least one speculative chromosome if a desired cost associated with the set of parameters has not been achieved.

24. (Currently Amended) A method for selecting a value set associated with a set of parameters of a circuit design, comprising:

determining a real cost of a first value set associated with a set of parameters the first value set corresponding to a circuit configuration associated with the circuit design generated by a circuit analysis tool;

generating a second value set based on a difference in at least one value of the first value set; and

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approximating a speculative cost for the second value set based on the difference and the real cost.

25. (Original) The method of claim 24, further comprising generating a third value set based on an incremental difference in at least one value of the second value set and approximating a speculative cost for the third value set based on the incremental difference in at least one value of the second value set, and the speculative cost associated with the second value set.

26. (Original) The method of claim 25, the first value set is represented as real chromosome and the second and third value sets are represented as speculative chromosomes, the second and third value set being generated by a genetic algorithm.

27. (Original) The method of claim 26, further comprising executing the genetic algorithm to generate a plurality of speculative chromosome generations from the second value set, and approximating a speculative cost for the speculative chromosomes based on incremental differences in at least one value between parents and child speculative chromosomes and costs of at least one of the parent chromosomes.

28. (Original) The method of claim 27, further comprising validating at least one speculative chromosome by determining a real cost associated with the at least one speculative chromosome, and replacing at least one real chromosome associated with the first value set with the at least one speculative chromosome if the at least one speculative chromosome has a lower real cost than the at least one real chromosome.

29. (Original) A computer-readable medium having computer-executable instructions for performing the method of claim 24.